



March 26, 2013

To: Mr. Bill Piazza  
Los Angeles Unified School District  
Office of Environmental Health and Safety  
333 South Beaudry Avenue, 28<sup>th</sup> Floor  
Los Angeles, California 90017

Re: Response by Cindy Sage, Sage Associates on February 28, 2013 regarding  
URS Radiofrequency (RF) Technical Report, Use of Wireless Devices in Educational  
Settings

Dear Mr. Piazza:

URS has reviewed Ms. Sage's comments regarding the URS-submitted RF Technical Report. Below please find URS' responses to these comments. Please feel free to contact me if you have any comments or questions.

Regards,

Gayle Nicoll, PhD, REP



Sage Comment 1: Does the URS Report Calculate RFR from WLAN Access Points and Wireless Tablets?

“It is unclear whether this URS Report addresses the potential emissions and possible health impacts of wireless devices held by children in their hands and/or laps; and the RFR contribution of multiple operating tablets in one classroom, as well as the wireless access point emissions (the WLAN access points contribution to overall classroom RFR). Calculations should be included in the revised URS Report to LAUSD.”

URS Response: Previously, URS reviewed LAUSD calculations, which included calculations for both tablet and access point devices under a variety of different configurations. The LAUSD followed FCC Technical Bulletin 65 guidance, specifically equation (4). Note that the Technical Bulletin states that this equation is “...generally accurate in the far-field of an antenna but will over-predict power density in the near field, where [the equation] could be used for making a ‘worst case’ or conservative prediction.” Information regarding the EIRP was obtained from device manufacturers. The duty factor was based on the published work of Khalid *et al.* (2011). Based on those calculations, the LAUSD determined that a tablet device with an EIRP of 500 mW would satisfy the  $0.1 \mu\text{W}/\text{cm}^2$  cautionary level.

“URS has advocated compliance with the 2007 BioInitiative Report level of 0.1 microwatts per square centimeter (0.6 volts per meter). The stated conclusion (Section 6) says: “*A recommended cautionary level of  $0.1 \text{ mW}/\text{cm}^2$  is attainable within LAUSD classrooms, based on calculations that have been performed.*” (emphasis added) Providing the calculations will show what RFR exposure sources are considered; and how compliance with the  $0.1 \text{ uW}/\text{cm}^2$  [sic.] level is confirmed.

URS Response: URS did not advocate compliance with the 2007 BioInitiative Report (BIR). The 2007 BIR does recommend a cautionary level of  $0.1 \mu\text{W}/\text{cm}^2$ , but the parameters of that cautionary level are not well-defined. The 2007 BIR does not specify whether the cautionary level applies to the whole body or to a portion of the body. The BIR also does not specify whether this cautionary level is an instantaneous value or a time-averaged value. Further, the BIR did not specify whether this cautionary level was to apply to each frequency, or to the sum of all RF frequencies. In contrast, URS advocated adopting a cautionary level of  $0.1 \mu\text{W}/\text{cm}^2$ , taken as a whole-body, time-averaged value consistent with accepted practice.

“Compliance would have to encompass all the ‘wireless classroom’ sources including the tablets and the wireless access points. A careful reading of the URS Report seems to indicate that only the whole-body WLAN emissions are investigated (calculated) for Common Core program compliance, but not the contribution of hand-held wireless devices (tablets) themselves.”

URS Response: URS is not advocating compliance with the 2007 BIR. Previous LAUSD calculations did take into account both the access points and the hand-held devices.

“The revised URS Report should provide calculations, and the assumptions on which the modeling is based in order for independent review to be possible. Please provide assumptions on distance of student from wireless tablet; student from wireless access point(s); number of

wireless access points per classroom, the duty cycle assumed and which FCC equation(s) are used for calculations (FCC OET 65 Equation 6 or 10).”

**URS Response:** Please see above. LAUSD calculations were previously reviewed by URS.

**Sage Comment 2:** What is Meant by Time-averaging?

“This does not specify the time averaging period, which could be any period of time. It also does not say if the wireless access points are turned off when classes are not actively accessing the internet via wireless devices. It does not say whether the access points are hardwired or plug-ins. Hardwired access points cannot be turned off, so that would mean constant RFR exposures in every classroom. Time averaging for whole-body exposures could render the recommendation meaningless if it includes too much time, diluting out high RFR exposures of [sic.] by making them invisible over a longer time course combined with ‘no exposure’ periods of classtime.”

**URS Response:** Please see above. LAUSD calculations were previously reviewed by URS. Worst-case calculations were performed using the FCC Technical Bulletin 65 parameters.

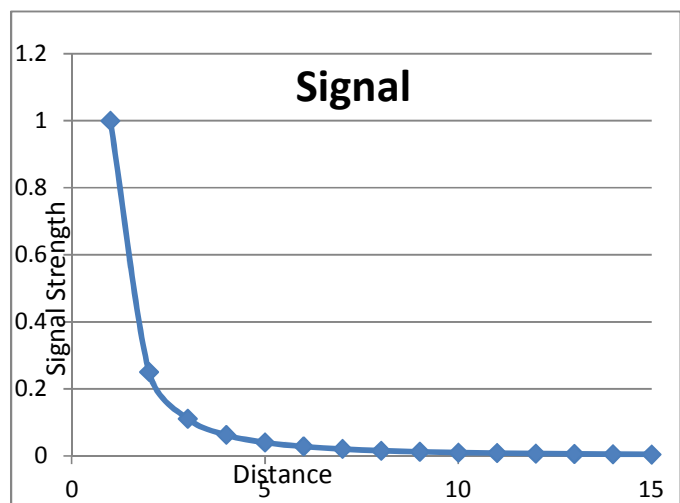
**Sage Comment 3:** Does the URS Report Substantiate that the LAUSD Common Core Wireless Classroom Program Complies with BioInitiative 2007 Recommendations?

“Compliance with the 2007 BioInitiative recommendation of 0.1 uW/cm<sup>2</sup> [sic.] (0.6 volts per meter) is unlikely to occur when the RFR levels of exposure from wireless devices (tablets) as well as the RFR from WLAN access points are included in this assessment.”

**URS Response:** URS is not advocating compliance with the 2007 BIR. Please see URS response above. LAUSD calculations provided to URS did take into account RF exposure from both the access point(s) and the tablet devices.

“Each tablet operating in a classroom will create more cumulative RFR to which all other children are then exposed (whole-body) as well the localized RFR exposure to the child holding the tablet. The Report is not then informative to the LAUSD about ‘the implications of wireless technology into the school system’. Decision-making about health impacts to children that may result from adoption of the wireless component of Common Core programs needs to address all wireless components of the Common Core wireless technology proposal, not just one contributing portion.”

**URS Response:** Calculations were reviewed from the LAUSD, as stated above. The calculations included both access points and tablet devices. It is important to note that the signal from any EMF-generating device decreases exponentially, as a function of  $1/r^2$ , where  $r$  = the distance from the EMF-generating device. Thus, the signal at 2 inches from the device is  $\frac{1}{4}$  the strength of the signal measured at 1 inch from the device. A



simplistic representation of this concept is illustrated in Figure 1. Figure 1 illustrates that, even if many EMF-generating pieces of equipment are all operating simultaneously within a classroom, the primary EMF-exposure experienced by any human being within the classroom will be from the EMF-generating device closest to the human being, because the EMF contributions from more distant devices will be significantly smaller, even when summed together.

“This is a non-informative summation. “Conflicted” is not a useful term in this context. It diminishes the weight of substantial evidence for possible health harm. It implies that ‘conflicted’ equates to ‘unknown’ and the studies overall somehow ‘balance out’ to equal nothing. There are thousands of peer-reviewed, published scientific papers reporting bioeffects and adverse health effects from low-intensity ELF-EMF and RFR exposure. There are also many papers that do not report effects. But, this is typical of scientific investigations in all areas of research.”

URS Response: Foster and Trottier (February 15, 2013) summarized the state of research concerning EMFs and health effects best:

“... government and other agencies have funded many studies over the years. Thousands of scientific papers have accumulated on biological and possible health effects of ELF and RF fields, going back to the mid 20<sup>th</sup> Century and even before.

“In many respects this scientific literature is uneven and confused. The studies vary widely in quality, biological endpoint, and relevance to health. The literature is filled with low-quality fishing expeditions in search of effects (as opposed to studies that tested hypotheses). Many of these studies were one-shot experiments, that were not followed up or even repeated by the investigators themselves. Many studies have obvious technical flaws, typically poor dosimetry (determining how much exposure the preparation actually received in an experiment) or poor temperature control (heating is a necessary consequence of RF exposure and most biological reactions are sensitive to temperature). Many of the reported effects were small, close to the level of background variability and small compared to potential artifacts (and hence difficult to identify reliably), with no particular relevance to health. The literature suffers badly from publication bias — researchers are more likely to report having found an “effect” and less likely to publish no effect studies. As might be expected, the literature abounds with reports of “effects”, many of which are simply artifacts from poorly conducted experiments.

“At the opposite end of the quality spectrum are a number of well-done, massively funded studies that follow the lines of standard toxicological assays or epidemiology studies, which were designed to provide reliable evidence in assessing possible risks from ELF or RF fields. The results of these studies have been overwhelmingly negative, failing to document adverse (or any) effects of exposures at levels below current safety limits that are in effect throughout most of the world.”

Thus, URS stands by the original passage.

Sage Comment 4: URS Omits Mention of DDT and Lead as Group 2B Carcinogens (Section 4)



“URS does address the most important scientific review by international experts appointed by the WHO IARC that classified RFR as a Group 2B Possible Human Carcinogen. However, in the listing of other 2B carcinogens, the Report should be revised to list DDT and lead as well, which are both in this same Group 2B as RFR. Those listed in the URS Report only include coffee, coconut oil, pickled vegetables, gasoline exhaust, talcum powder, and nickel. Clearly, no child would be required by any school district to consume any of these substances every day as a mandatory part of classroom participation, particularly DDT and lead, for which the District already has strict controls and policies in place.

URS Response: While lead used to be classified by the IARC as a Group 2B Possible Human Carcinogen (Volume 23, 1980; Supplement 7, 1987), lead is currently classified as a Group 2A Probable Human Carcinogen (IARC, in press).

DDT is currently listed as a Group 2B Possible Human Carcinogen by the IARC. However, the very name “DDT” has negative connotations in the general public because of adverse health effects to birds, first reported in *Silent Spring* in 1962 by Rachel Carson. While Carson suggested that DDT may be a carcinogen, the World Health Organization (WHO) has not found conclusive evidence of carcinogenicity in humans. The WHO reports, “The results of epidemiological studies of pancreatic cancer, multiple myeloma, non-Hodgkin lymphoma and uterine cancer did not support the hypothesis of an association with environmental exposure to the DDT complex. Conflicting data were obtained with regard to some genotoxic end-points. In most studies, DDT did not induce genotoxic effects in rodent or human cell systems, nor was it mutagenic to fungi or bacteria.” (WHO, 2013) In addition, DDT is still used around the world in circumstances where the health benefits of controlling malaria outweigh any potential health risk.

The focus should not be on the example substances listed, but rather on the fact that the IARC definition of “Possible Human Carcinogen” means “there is limited evidence of carcinogenicity in humans and less than sufficient evidence of carcinogenicity in experimental animals. It may also be used when there is inadequate evidence of carcinogenicity in humans but there is sufficient evidence of carcinogenicity in experimental animals.” (IARC, 2006) Some 200+ compounds are identified by IARC as Possible Human Carcinogens. URS can attach this list; however, a complete analysis of all 2B compounds is beyond the scope of this report. The examples that were given (coffee, coconut oil, pickled vegetables, gasoline exhaust, talcum powder, nickel) were for comparison purposes only.

“The salient point of this assessment is absent – that LAUSD is proposing to install a technology that exposes hundreds of thousands of adults and children under its [sic.] jurisdiction to a designated Possible Human Carcinogen with chronic RFR levels associated with increased risk of health harm (Baan et al, 2011).”

URS Response: LAUSD can successfully implement the  $0.1 \mu\text{W}/\text{cm}^2$  limit described in the report while allowing the use of WLAN devices and allowing the children the educational benefit thereof.

Sage Comment 5: The URS Report Does Not Fully and Properly Characterize BioInitiative Report Recommendations



“The URS Report should fully characterize the BioInitiative Report recommendations in both the 2007 and 2012 Reports. URS should more carefully relay to LAUSD the conclusions of Sections 1, 20 and 24 in the 2012 BioInitiative Report that specify that [sic.] children should not be exposed to wireless technologies, regardless of RFR exposure levels, while in schools. No numeric level of RFR is judged to be acceptable for children in BioInitiative 2012.”

URS Response: The URS report was not designed to analyze each section of the BIR platform. Rather, to present a balanced report, URS summarized recommendations from a variety of sources, including the BIR. If URS includes the quotes from the BIR that Ms. Sage recommends into the report, then URS would also have to include the statements from equivalent sources that counter certain aspects of the BIR. Below is a small sample of the criticism of the BIR:

- From “Picking Cherries in Science: The Bio-Initiative Report” (Foster & Trotter, 2013):

“...the BIR is inconsistent in approach and content. The 2007 chapter by David Gee (European Environment Agency) says almost nothing about EMF but is largely taken from a separate paper that discusses “late lessons from early warnings” about, for example, the tragedy of Diethylstilbestrol (a drug that was supposed to prevent miscarriage but later was found to cause birth defects in children whose mothers had used the drug). Many pages consist simply of abstracts copied from the original papers or from Pubmed (which may raise fair-use issues). Several chapters discuss the idiosyncratic theory of Blank (retired from Columbia University) that DNA is a “fractal antenna”, a theory that has received no independent scientific support, much less general acceptance by the scientific community. Nevertheless, his theory is repeatedly cited throughout the BIR as being somehow related to a mechanism by which weak RF or ELF fields can damage DNA...

“As an example of another source of radiation, ordinary sunlight (one of the many forms of EMF) has an energy density of about 100 mW (milliwatt or a thousandth of a watt)/cm<sup>2</sup>, which is more than 100 million times stronger than the proposed BIR limit for RF energy. Sunlight contains little RF energy, but about half of the solar energy that hits the earth is in the infrared part of the spectrum, which is just above the radiofrequency region considered by the BIR.

“Depending on how these limits would be implemented (a matter not discussed in the BIR), their implications might be profound. All urban areas have many places where RF signals from cellular base stations, television and radio broadcasting facilities, public safety communications systems, and other useful technologies will exceed these limits – sometimes by a very large factor. Signals from Wi-Fi devices, mobile phone handsets, cordless phones, and many other useful devices would also exceed the limits, as would transmissions from the police car driving through your neighborhood, and energy leaking from your kitchen microwave oven – the strongest RF source in most households. Radar for air traffic control would be ruled out by the recommendations. Assessing compliance with the proposed BIR limits would certainly create a lot of work for Sage Associates Environmental Consultants, and undoubtedly for legions of lawyers as well...

“The authors (at least the two authors who wrote the summary sections) based their cautionary recommendations on the lowest exposure levels used in studies that reported



effects – regardless of the health significance of the effects, the scientific credibility of the studies, and presence of contradictory evidence... The table only includes lists of studies reporting effects, some at vanishingly small exposure levels. Studies that did *not* report effects, or which could not confirm studies that earlier had reported effects, are conspicuously missing.”

- From the Health Council of the Netherlands (2008):

"In view of the way the BioInitiative report was compiled, the selective use of scientific data and the other shortcomings mentioned above, the Committee concludes that the BioInitiative report is not an objective and balanced reflection of the current state of scientific knowledge."

- From the Australian Centre for Radiofrequency Bioeffects Research (ACRBR) (2008):

“Overall we think that the BioInitiative Report does not progress science, and would agree with the Health Council of the Netherlands that the BioInitiative Report is ‘not an objective and balanced reflection of the current state of scientific knowledge’. As it stands it merely provides a set of views that are not consistent with the consensus of science, and it does not provide an analysis that is rigorous-enough to raise doubts about the scientific consensus.”

- From the European Commission EMF-NET Review (2007):

“There is a lack of balance in the report; no mention is made in fact of reports that do not concur with authors’ statements and conclusions. The results and conclusions are very different from those of recent national and international reviews on this topic... If this report were to be believed, EMF would be the cause of a variety of diseases and subjective effects...”

- From the German Federal Office for Radiation Protection (BfS) Review (2007):

“Das Bundesamt für Strahlenschutz (BfS) hat den Bericht unmittelbar nach dessen Publikation einer ersten Prüfung unterzogen und festgestellt, dass er klare wissenschaftliche Schwächen aufweist: Insbesondere werden Vermischungen der gesundheitlichen Wirkungen von niederfrequenten und hochfrequenten Feldern vorgenommen, die fachlich nicht zulässig sind. Die überwiegende Mehrzahl der dem Report zugrunde liegenden Studien ist nicht neu: Sie wurden bei der Festlegung der derzeit gültigen Grenzwerte bereits berücksichtigt.”

(Translation:) “The BfS conducted a preliminary review of the so-called "BioInitiative Report" immediately after its release and concluded that it had clear scientific shortcomings. In particular, it has undertaken to combine the health effects of low- and high-frequency fields that are not technically possible. The overwhelming majority of studies underpinning the report are not new: they already have been taken into account in the determination of currently applicable standards."

- From the Institute of Electrical and Electronics Engineers (IEEE) Committee on Man and Radiation Review (COMAR, 2009):

"... the weight of scientific evidence in the RF bioeffects literature does not support the safety limits recommended by the BioInitiative group. For this reason, COMAR



recommends that public health officials continue to base their policies on RF safety limits recommended by established and sanctioned international organizations such as the Institute of Electrical and Electronics Engineers International Committee on Electromagnetic Safety and the International Commission on Non-Ionizing Radiation Protection, which is formally related to the World Health Organization."

• From the Cellular Operators Association of India (COAI) Review (2013):

"The 2012 BioInitiative Report, like its predecessor, is an informal interpretation of a limited selection of the available scientific information on electromagnetic fields (EMF). The report is largely critical of the internationally accepted and most widely adopted EMF exposure standards developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP), which have been endorsed by the World Health Organization (WHO), and the International Committee on Electromagnetic Safety of the Institute of Electrical and Electronics Engineers. The report does not include any new scientific data but reflects the interpretations of individual authors who do not have consensus among themselves.

"In fact, there have been revelations that the report relies for 'evidence' on studies from Oberfeld-who claimed to have found an increase in cancer from a base station that was not in existence at the location claimed-resulting in the ultimate withdrawal of the study; and also from De Pomerai-who claimed to have found 'non-thermal' effects on nematodes but who later admitted that his earlier study design was flawed and did cause heating-he was essentially cooking and starving the nematodes. Hence we can see that the authenticity of the report in question is highly ambiguous and does not qualify for applicability in an issue as critical and sensitive as public health and well-being."

Sage Comment 6: URS Has Not Document the RFR Baseline Studies It Refers To When Dismissing the BioInitiative 2012 Numeric Recommendation as Unrealistic and Unattainable

"Please provide data on which this assumption is based. Has anyone conducted baseline RFR studies at these schools? If LAUSD has conducted baseline RFR measurements of school campuses and classrooms where WLAN technology is proposed, it should be included in the revised URS Report."

URS Response: The text Ms. Sage is referring to appeared beneath Table 5, which contained five independent references from previous research that has been done establishing that existing RF EMF levels are above the 2012 BIR precautionary level. In addition, the paragraph directly below Table 5 cites the WMO as an additional reference. Thus, six references were already provided in the original report.

Sage Comment 7: Is This Cell Tower Technology in the Classroom?

"Approval of the Common Core Technology program for wireless devices and classroom wireless access points will violate the Board of Education policy on cell tower radiation.

"This is exactly correct. The URS Report confirms that cell phone radiation frequencies of the type from WLANs proposed under the Common Core Technology program are essentially the same as for cell phone communications and data transmissions in Section 3. "Because Smart





Meters, cell phones, and WLAN devices share many commonalities, a summary of each of these technologies and recent research on RF EMFs pertaining to these devices is summarized below.”

URS Response: Ms. Sage appears to be confusing WLAN technology with cellular phone technology. WLAN operates over shorter distances than cell phones, thus requiring lower power densities. Perhaps Ms. Sage is confusing WLAN technology with 3G or 4G technology for wireless devices, which do use cellular towers as a form of information transmission. The URS report clearly states: “The recommendations contained in this paper apply to WLANs only. While other RF technologies that provide wireless broadband access are available for use, such as WiMAX, CDMA, or LTE, these technologies operate at higher power densities and would require further research and evaluation.” (Executive Summary, page 1-2) Further, the Board of Education policy specifically applies to the siting of cellular towers near schools, not to the use of WLANs within schools.

Sage Comment 8: URS Discussion on Sage Report on Smart Meters is Factually Incorrect

From the URS Report, Section 3.

“Most notably, the Sage study did not time average the data collected, used out-of-date FCC policy, claimed that a 1000%+ reflection was possible, assumed that incident power density is enhanced by reflections uniformly throughout the surrounding space, and did not frequency-weight the contributions from the endpoint meter, the home area network, and the cell relay, all of which operate at different frequencies.”

This is factually incorrect. We request that this error be corrected, and a revised report be prepared by URS and transmitted to LAUSD, its Board and staff. Our report used FCC OET 65 formulas using 60% and 100% reflection factors. Please revise and recirculate. The Sage Report on Smart Meter RF Emissions (2011) calculated four reflection coefficients including 60% reflection (FCC OET 65 Equation 10), 100% reflection (FCC OET 65 Equation 6), as well as 1000% and 2000% reflection factors. All calculations are available for review. The study is entirely consistent with FCC rules. Further, URS should amend its discussion to note that duty cycles from 1% to 100% (in intervals of 10% per table) were provided.

URS Response: The critique was based on sound scientific principles, as outlined in the Electric Power Research Institute’s (EPRI) Comment on Sage’s Report (2011). Highlights from the EPRI comments include the following:

- “The duty cycle for cell relays (referred to as “collectors” in the Sage Report) within the same sample did not exceed 1% [as documented by EPRI]. The Sage Report defaults to compute exposures based on a 100% duty cycle, thus over-estimating exposure in the sample cited above by no less than 20-fold and more typically more than 400-fold.”
- “The FCC states that to characterize a person’s exposure properly, the RF power density should be averaged across the entire volume of an exposed body. An example in the EPRI Report indicates that power density averaged over the body of a 6-foot person situated one foot in front of a meter is less than approximately one-quarter of the emission at the point of the wavefront’s peak at that distance. The Sage Report assumes a uniform field across the body that is equal to the peak power density within a body’s cross-section, thus overestimating an individual’s exposure.”

- “The level of a reflected wave that is present at any point is expressed as a percent of the electric field of the incident wave, which is the free-space wave in the absence of any reflection. The power density at that point is the incident power density multiplied by  $[1+(\text{percent of reflection}/100)]^2$ . The FCC’s worst-case scenario is a 100% reflection (4-fold increase in power density), with a less conservative though more realistic value of 60% (2.56-fold increase in power density) used in many cases as an upper bound (e.g., see EPRI White Paper 1020798, “A Perspective on Radio-Frequency Exposure Associated With Residential Automatic Meter Reading Technology”). A key element to factoring reflections into an exposure calculation is that, for RF emitters like smart meters in real-world residential environments, the percent reflection diminishes as one approaches the meter. Thus, at the distance at which incident power density is maximal, the contributions of reflections to total power density are minimal. The Sage Report assumes that incident power density is enhanced by reflections uniformly throughout the space surrounding the meter.”
- “The Sage report, in discussing exposure with relation to specific anatomic sites that include eyes and testes, referred to stipulations in an outdated 1999 IEEE standard. The current IEEE standard, published in 2005, with extensive documentation on the topic, removed any exceptions for such anatomic sites.”
- “In comparing field calculations to the FCC limits, the Sage Report did not frequency weight the contributions from the end-point meter (~900 MHz), the Home Area Network (HAN) antenna (~2,400 MHz) and the cell relay (~850 MHz). Because the FCC exposure limits are frequency dependent, a simple arithmetic addition of contributions from various sources is an inappropriate approach to compliance assessment.”

What’s more, the FCC Technical Bulletin 65 states, “For a truly worst-case prediction of power density at or near a surface, such as at ground level or on a rooftop, 100% reflection of incoming radiation can be assumed, resulting in a potential doubling of predicted field strength and a four-fold increase in (far-field equivalent) power density.” Ms. Sage was not using a far-field equivalent power density in her study. The FCC Technical Bulletin 65 does not recommend reflections of greater than 100%. Based on the EPRI comments and FCC documentation, URS’s statements stand.

**Sage Comment 9:** URS Report Calculations Are Required by FCC Rules to Use a 100% Duty Cycle

“But most importantly, both URS and LAUSD should be made aware that the FCC rules in OET Bulletin 65 mandate a 100% duty cycle when using the FCC equations 6 and 10 “where the public cannot be excluded.” Certainly this applies to WLAN calculations within a classroom where student attendance [sic.] is mandatory, rather than excluded. The URS calculations are REQUIRED to use a duty cycle of 100% by FCC rules (Sage, 2011).”

**URS Response:** A complete search of FCC Technical Bulletin 65 was performed. Nowhere in the Bulletin does the phrase “where the public cannot be excluded” exist. What’s more, the FCC Bulletin does not mandate the use of a 100% duty cycle. Rather, the FCC Technical Bulletin regarding Mobile and Portable Devices actually states, “Portable and mobile devices present



something of a special case with respect to evaluating RF exposure. The user of such a device would most likely be in the near vicinity of the RF radiator, and the predictive methods described above may not apply in all cases. Therefore, evaluation of exposure due to these devices requires special consideration.” (page 40)

Further, the FCC states, “Transmitting devices designed to be used by consumers or workers that can be easily re-located, such as wireless devices associated with a personal computer, are considered to be mobile devices if they meet the 20 centimeter separation requirement.” (page 40) Therefore, this classification would apply to wireless tablet devices.

And finally, in several places within the FCC Technical Bulletin 65, the FCC states, “...’source-based’ time-averaging based on an inherent property or duty-cycle of a device is allowed.”

Sage Comment 10: URS Summary - Errors and Omissions

“This would lead to a conclusion then that because cell phones are consistently linked with increased risk for glioma and acoustic neuroma, that WLAN exposure is quite unsafe?”

URS Response: Ms. Sage’s comment that “cell phones are consistently linked with increased risk for glioma and acoustic neuroma” is incorrect. Trottier (2012) summarized the conclusions of multiple regulatory agencies around the world:

“Expert groups of most of the world’s major public health organizations have taken the same position as the European Commission’s Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR) which had stated that (P 8): “It is concluded from three independent lines of evidence (epidemiological, animal and in vitro studies) that exposure to RF fields is unlikely to lead to an increase in cancer in humans“. The representative of the US National Cancer Institute walked out of the IARC meeting before the voting. The NCI issued a statement quoting other studies stating that: “overall, cell phone users have no increased risk of the most common forms of brain tumors — glioma and meningioma“.

“Immediately following the IARC decision the WHO issued a reassuring new Fact Sheet on mobile phones and public health: “A large number of studies have been performed over the last two decades to assess whether mobile phones pose a potential health risk. To date, no adverse health effects have been established as being caused by mobile phone use“. Since this controversial IARC classification, several new papers have been published that substantially undermine the weak evidence on which the IARC based its assessment.”

“Exposures for some wireless laptops and wireless devices are shown to result in excessively high levels of RFR exposure for the user, and even exceed FCC safety standards in some cases (BioInitiative 2012). This information should be considered in reaching a conclusion about compliance based on duty cycle.”



URS Response: URS consulted reliable sources that were specifically relevant to the use of WLANs in a school environment. As such, the Khalid *et al.* (2011) study was the most relevant, as the study was conducted by a reputable agency, used multiple methodologies to attempt to reproduce the results, and focused on the use of wireless devices within a classroom setting while schoolchildren were present.

“These last two statements do not seem to support a finding that either distance nor lower power density can equate to safety of use of a wireless tablet in the hands of a child, where the RFR wireless access point(s) contribute cumulative exposures, and where multiple tablet devices are operating and contributing additional RFR exposure.”

URS Response: Please refer to the discussion above regarding the Inverse Square Law ( $1/r^2$  law), which applies to all EMFs. The access points would be placed into the ceiling of the classroom, resulting in minimal exposure to a child anywhere in the classroom because of the  $1/r^2$  law. Thus, as stated before, the primary RF exposure will be from the wireless device itself, which has been calculated to be within the  $0.1 \mu\text{W}/\text{cm}^2$  previously discussed.

“IARC specifies that it is the exposure to RFR (not a particular device or source of RFR regardless of intensity) has been classified as a Possible Human Carcinogen. It is not possible to determine if tablet use exposes children to less RFR than cell phones. It depends on how they are used and how long they are used. And, it depends on the cumulative RFR from the user’s tablet, all other tablets being used in proximity, and the WLAN access point RFR, and any other baseline sources of RFR in the classroom.”

URS Response: It is quite “possible to determine if tablet use exposes children to less RFR than cell phones.” Previous LAUSD calculations reviewed by URS show that the power density required of a WLAN system can meet the  $0.1 \mu\text{W}/\text{cm}^2$  level previously discussed. Simple logic also dictates that WLAN systems will have significantly lower power densities and RF exposure than cellular telephones, because the distance over which the signal has to travel is lower. Thus, the power requirements of a WLAN are lower than for cell phones.

“Mandatory WLAN device exposures are inherently risky for children in school classrooms. IARC designated RFR as a Possible Human Carcinogen in 2011. Surely the LAUSD would not now be able to defend WLAN at all; nor defend WLAN exposures as ‘less risky’ by comparison to mandatory use of cell phones. Cell phone use has been linked to a doubling of risk of malignant brain tumor in adults, and a five-fold increased risk for children. Wireless devices like tablets create very substantial RFR exposures, and it will be very difficult to control behavior of children in all cases, and not at all possible to monitor when wireless devices are taken home for homework. It also begs the question whether adoption of the Common Core Technology program means every home must also have a wireless router. This would further increase RFR exposures adding to potential health risks for an entire family, and increase the cumulative RFR burden on every school child (both home and classroom RFR exposure).”

URS Response: Ms. Sage brings up several points in this paragraph. These points are addressed in the order they appear in the preceding paragraph:

- As discussed earlier in this response, Category 2B Possible Human Carcinogen does not mean that the substance has been verified to be a carcinogen. As Dr. Foster stated, “Saying that something is a ‘possible carcinogen’ is a bit like saying that someone is a ‘possible shoplifter’ because he was in the store when the watch was stolen.” (Trottier, 2012)
- As discussed earlier in this response, WLAN operates at lower power than cell phones. Therefore, markedly less RFR will be experienced by a child using a tablet device in a school setting than from that same child making a telephone call on the child’s own cell phone. This RFR experienced by the child is also markedly less than what the child would receive from standing in near proximity to an operating microwave oven.
- To the best of URS’ knowledge, the LAUSD has never contemplated making cell phone use mandatory.
- The study that Ms. Sage cites regarding EMF and brain tumors is an Interphone study (IARC, 2010). One portion of study states, “for a small proportion of study participants who reported spending the most total time on cell phone calls, there was some increased risk of glioma, but the researchers considered this finding inconclusive”. Failings with this portion of the study included the following (EMF & Health, 2009):

- In a high percentage of cases, the subject did not answer the questionnaire because the subject was too ill or deceased. A friend or relative answered the questionnaire based on their estimates of cell phone use, not the actual cell phone use of the subject.
- Subjects were judged to be unreliable. Because subjects were self-reporting, they may have over- or under-estimated their cell phone use. The authors noted that respondents tended to exaggerate their use of a cell phone.
- Lack of consistency in the data. The risk of cancer did not increase with increased exposure time.

- In contrast, the full text of the Interphone report makes other claims that would tend to refute the finding that Ms. Sage cites from this one group within the study, including the following:

- Decreased risk [of cancer] for regular use of a cell phone.
- “Overall, no increase in risk of glioma or meningioma was observed with use of mobile phones.”

- Wireless devices like tablets do not “create very substantial RFR exposures,” according to the work of Khalid *et al.* (2011).
- Ms. Sage implies that RF exposure to children will modify their behavior, but no reputable research has been done to substantiate this claim.
- Based on LAUSD calculations provided to URS for review, the approved tablet devices could be used 24-hours a day with a duty factor of 4% or less, which is markedly more than the duty factor that Khalid *et al.* (2011) reported. A 4% duty factor was recommended by URS in order to build in a safety margin, and still meet the 0.1  $\mu\text{W}/\text{cm}^2$  level. Therefore, the LAUSD would not be exposing children or adults to elevated levels of RFR.





“This is simply impossible to establish, and should be deleted. It depends enormously on the distance, how the smart meter is positioned in relation to occupied space, and how the space inside a home is utilized.”

**URS Response:** The focus of the report was on WLAN RF EMF exposure, not on the use of Smart Meters. However, EMFs.info (2013) states, “Lots of different figures are quoted for the overall fraction of time Smart Meters transmit for - the duty cycle - and this is partly because meters are used in different ways by different utilities.” In addition, the URS report justified the statement by stating:

- Smart Meters communicate on a frequent, fixed schedule with other devices, where WLAN devices communicate on a sporadic, on-demand schedule.
- Smart Meters communicate not only with the data-collection end device, but also with multiple appliances within the living space. In contrast, WLAN end devices, which would be responsible for most of a user’s RF EMF exposure, communicate primarily with the AP only, and only to a much lesser degree with surrounding end devices.

“If this statement is meant to mean that Common Core Technology wireless exposures are less than that of smart meters, which transmit RFR to the power transmitters in appliances and also to the wireless electric meter, there is no basis for drawing a comparison yet. There is no verifiable basis for establishing this statement. Power transmitters are not yet commercially available and operating within the ‘smart meter’ system. No conclusions can be drawn yet as to exposures for occupants. Nothing in this statement provides for a legitimate comparison to a student in a classroom with multiple transmitting tablets being used by the other students, the RF exposure from the tablet the student is actually holding, and the wireless access point(s) installed around the room.”

**URS Response:** Power transmitters are commercially available for the smart meter system. According to PG&E (2013), the power density measured at one foot from an electric Smart Meter may be up to  $8.8 \mu\text{W}/\text{cm}^2$ , which is substantially more than the calculated  $0.1 \mu\text{W}/\text{cm}^2$  associated with LAUSD’s proposed WLAN system.

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Response to Comments

From Cindy Sage, dated 02/28/2013

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